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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/715,051
Filing Date: November 17, 2003
Appellant(s): KRAMER, DENNIS A.

Theodore W. Olds
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/6/06 appealing from the Office action mailed 11/22/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,784,244	Carre et al.	11-1988
6,272,936	Oreper et al.	8-2001

6,397,977 Ward 6-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re: claim 21. The phrase "a braking force" in line 4 is indefinite. It is unclear to the Examiner whether this braking force is the same or different from the earlier recited braking force. A similar issue exists with the term "a clearance" in line 2 from the bottom. The phrase "components of the disc brake" in line 4 is indefinite. It is unclear whether the components in this claim are intended to be the same or different from the brake pad and the item to be braked earlier recited.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4784244 to Carre et al.

Re: claim 1. Carre et al. show in figure 1 a disc brake 2 comprising an actuation mechanism 8,9 being movable to apply a braking force via intervening elements, a pair of pistons one shown at the end of the lead line of number 15 and the other shown surrounding element 29 movable upon receipt of the braking force to force a brake pad shown connected to element 4a into contact with an item to be braked, an adjustment mechanism 14,17 for adjusting the location of the pistons to take up clearance with wear in the brake pad, and a force sensor 23 for sensing a reaction force to the braking force, and identifying a point of force application increase indicative of initial contact of the brake pad with the item to be braked, the force sensor sending a signal to an electric control 24 for the adjustment mechanism.

Re: claim 21. Carre et al. show in figure 1 wherein the signal is utilized to identify the point of force application and the point of force application is associated with a rotational position of a portion of the actuation mechanism or the rotational position of wheel 14, the rotational position being utilized after application of a braking force (for example, after the first braking application) to indentify a gap between components of the disc brake, to in turn identify a clearance that is adjusted by the adjustment mechanism after the application of the braking force via element 28 as disclosed in col. 3 lines 29-30.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carre et al. in view of US Patent 6272936 to Oreper et al.

Re: claims 7 and 10. Carre et al. describe the invention substantially a set forth above including the limitation of a force sensor, but fail to specifically disclose that the force sensor is an electric sensor receiving a current and having a resistance that varies with the force applied to the force sensor.

Oreper et al. teach the use of a force sensor that is an electric sensor receiving a current and having a resistance that varies with the force applied to the force sensor. See paragraph [0008] of the instant invention.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the force sensor of Carre et al. to have specifically been an electric sensor receiving a current and having a resistance that varies with the force applied to the force sensor, as taught by Oreper et al., in order to provide a sensor with optimum sensitivity.

Re: claims 8, 9, 11, and 12. Carre et al. describe the invention substantially a set forth above including the limitation of a force sensor, but fail to specifically disclose that the force sensor includes a protective cover between a member which applies the reaction force and an electric portion of the force sensor which receives current and also fail to disclose the limitation of a relatively thin anvil member placed between the protective cover and the electric portion.

Oreper et al. teach in figures 2 and 8 and in Applicant's admission in paragraph [0008] the limitation of the force sensor including a protective cover between a member which applies the reaction force and an electric portion of the force sensor which receives current and the limitation of a relatively thin anvil member placed between the protective cover and the electric portion.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the structure of the force sensor of Carre et al. to have included a protective cover between the member which applies the reaction force and an electric portion of the force sensor and to have included a thin anvil member between the protective cover and the electric portion, as taught by Oreper et al., in order to provide a means of limiting the amount of force that can be transferred throughout the device to protect the sensor.

7. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6397977 to Ward in view of Carre et al.

Re: claim 1. Ward shows in figure 1 a disc brake 10 comprising an actuation mechanism described in col. 4 lines 24-28 being movable to apply a braking force via intervening elements, a pair of pistons 24,24 movable upon receipt of the braking force to force a brake pad 26 into contact with an item 1a to be braked, an adjustment mechanism 14,18 for adjusting the location of the pistons to take up clearance with wear in the brake pad, and the presence of a reaction force to the braking force as disclosed in col. 4 lines 40-44.

Ward fails to show the limitation of a force sensor for sensing a reaction force to the braking force, the force sensor sending a signal to an electric control for the adjustment mechanism.

Carre et al. teach in figure 1 the use of a disc brake comprising a force sensor 23 for sensing a reaction force to the braking force and identifying a point of force application increase indicative of initial contact of the brake pad with the item to be braked, the force sensor sending a signal to an electric control 24 for the adjustment mechanism 8 of the disc brake.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the disc brake of Ward to have included a force sensor for sensing a reaction force to the braking force, the force sensor sending a signal to an electric control for the adjustment mechanism, as taught by Carre et al., in order to provide more accurate adjustments of the adjustment mechanism for brake control purposes as suggested in Carre et al. col. 4 lines 20-21.

Re: claim 2. Ward, as modified, teaches in figure 1 of Ward the limitation wherein the actuation mechanism is an eccentric shaft 14,18 the eccentric shaft driving at least one bearing 20 to in turn force the pistons and the brake pad toward the item to be braked.

Re: claim 3. Ward, as modified, describes the invention substantially as set forth above, but does not include the limitation wherein the force sensor is located to receive a reaction force from the eccentric shaft and the eccentric shaft applying the reaction force to the bearing.

Carre et al. teach in figure 1 the use of a force sensor 23 being located to receive a reaction force from a shaft 10,11 driving at least one rolling bearing 14 to force the pistons and the brake pad toward an item 1a to be braked.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have positioned a force sensor such that it received a reaction force from the eccentric shaft of Ward, as modified, in view of the teachings of Carre et al., in order to provide a means of detecting the force transmitted by the piston structure on the friction member as taught by Carre et al. in col. 3 lines 15-18.

8. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6397977 to Ward in view of Carre et al. and further in view of Oreper et al.

Re: claims 10-12. Ward shows in figure 1 a disc brake 10 comprising an actuation mechanism described in col. 4 lines 24-28 being movable to apply a braking force, a pair of pistons 24,24 movable upon receipt of the braking force to force a brake pad 26 into contact with an item 1a to be braked, an adjustment mechanism 18,14 for adjusting the location of the pistons to take up clearance with wear in the brake pad, and the presence of a reaction force to the braking force as disclosed in col. 4 lines 40-44.

Ward fails to show the limitation of a force sensor for sensing a reaction force to the braking force, the force sensor sending a signal to an electric control for the adjustment mechanism.

Carre et al. teach in figure 1 the use of a disc brake comprising a force sensor 23 for sensing a reaction force to the braking force and identifying a point of force

application increase indicative of initial contact of the brake pad with the item to be braked, the force sensor sending a signal to an electric control 24 for the adjustment mechanism 8 of the disc brake.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the disc brake of Ward to have included a force sensor for sensing a reaction force to the braking force, the force sensor sending a signal to an electric control for the adjustment mechanism, as taught by Carre et al., in order to provide more accurate adjustments of the adjustment mechanism for brake control purposes as suggested in Carre et al. col. 4 lines 20-21.

Ward, as modified, is silent as to the makeup of the force sensor specifically being an electric sensor receiving a current and having a resistance that varies with the force applied to the sensor.

Oreper et al. teach in figures 2 and 8 and in Applicant's admission in paragraph [0008] the limitation of the force sensor including a protective cover between a member which applies the reaction force and an electric portion of the force sensor which receives current and the limitation of a relatively thin anvil member placed between the protective cover and the electric portion.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the structure of the force sensor of Ward, as modified, to have included a protective cover between the member which applies the reaction force and an electric portion of the force sensor and to have included a thin anvil member between the protective cover and the electric portion, as taught by Oreper

et al., in order to provide a means of limiting the amount of force that can be transferred throughout the device to protect the sensor.

Re: claim 13. Ward, as modified, teaches in figure 1 of Ward the limitation wherein the actuation mechanism is an eccentric shaft 14,18 the eccentric shaft driving at least one bearing 20 to in turn force the pistons and the brake pad toward the item to be braked.

Re: claim 14. Ward, as modified, describes the invention substantially as set forth above, but does not include the limitation wherein the force sensor is located to receive a reaction force from the eccentric shaft and the eccentric shaft applying the reaction force to the bearing.

Carre et al. teach in figure 1 the use of a force sensor 23 being located to receive a reaction force from a shaft 10,11 driving at least one rolling bearing 14 to force the pistons and the brake pad toward an item 1a to be braked.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have positioned a force sensor such that it received a reaction force from the eccentric shaft of Ward, as modified, in view of the teachings of Carre et al., in order to provide a means of detecting the force transmitted by the piston structure on the friction member as taught by Carre et al. in col. 3 lines 15-18.

(10) Response to Argument

Applicant argues that claim 21 is definite and that the use of the phrases "a braking force" and "clearance" are clear despite the use of corresponding phrases previously recited in claim 1. Examiner notes that it is unclear to the Examiner whether

in claim 21 Appellant intends to refer to a different braking force and clearance from that recited in claim 1 or to the same braking force and clearance. Typically, when an Applicant intends to refer back to the same element, Applicant uses "the" or "said". Appellant even utilized the phrase "said braking force" in line 3 of claim 1 to refer back to the "a braking force" recited in line 2 of claim 1. The inconsistent use of "a" and "said" further adds to the indefiniteness of the recitations in claim 21. With regards to the terms "gap" and "clearance", Examiner notes that the rejection is withdrawn in light of Appellant's explanation on pg. 4 of the Brief.

With regards to claims 1 and 10, Appellant argues that "[s]imply nothing in Carre, et al. indicates the pressure sensor 23 is utilized with the adjustment mechanism." Examiner first notes that the argument is more specific than the claim language. The claim does not require that the force sensor be utilized with the adjustment mechanism. Instead the claim broadly and functionally recites "a force sensor for sensing a reaction force to said braking force." Accordingly, the claim requires that the force sensor of Carre et al. be capable of sensing a reaction force to the braking force. Carre et al. disclose in col. 3 lines 14-20 that the force sensor 23 is capable of and actually detects or senses a reaction force to the braking force. Examiner also notes that even if the claim recited what the Appellant argues, the adjustment mechanism in Carre et al. is represented by elements 14 and 17 shown in figure 1. Elements 14 and 17 are operatively connected to effect adjustment as a result of actuation of the actuation mechanism 8,9. Column 3 lines 21-27 clearly disclose that feedback signals from the force sensor 23 are utilized with the adjustment mechanism by being transmitted to the

electronic control unit 24 and from the control unit to the actuation mechanism 8,9 to cause adjustment of element 14 of adjustment mechanism 14,17. Also see col. 2 lines 54-59.

With regards to claim 21, Appellant argues that Carre et al. fail to show or suggest a rotational position of a portion of the actuation mechanism being used to identify a clearance to be adjusted by the adjustment mechanism. Examiner maintains that it is the rotational position of element 9 of the actuation mechanism that causes movement of the rollers 14 which effects braking which, in turn, generates a braking force and a reaction braking force that is sensed by the force sensor 23 and fed back to the motor portion 8 of the actuation mechanism to adjust the rotational position of portion 9 of the actuation mechanism.

With regards to the rejections of Ward in view of Carre et al., Appellant argues that "[n]othing in Carre, et al. would suggest the particular application of the sensor into the Ward patent such that it would receive a reaction force from the eccentric shaft 14." Examiner notes that Ward discloses a similarly structured disk brake as shown in figure 1 and discusses in col. 4 lines 40-43 the presence of a reaction force generated as a result of braking that is fed back through the intervening elements (including an eccentric shaft 14) supported by the inner housing part 16. Carre et al. teach in figure 1 a disk brake in which a reaction force generated as a result of braking that is transmitted through axially intervening elements and sensed at a force sensor arranged between the intervening elements and the inner housing part 2. Based on the teachings of Carre et al., it would have been obvious to one of ordinary skill at the time the invention was

made to have included a force sensor between the brake housing and the axially intervening elements including the eccentric shaft 14 located between the friction members and the brake housing in order to sense the reaction braking force. Carre et al. explicitly teach that the sensed reaction braking force is used to achieve more accurate control of the motor portion of the actuation mechanism and, consequently, more accurate brake actuation.

Accordingly, the rejections have been maintained by the Examiner.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Art Unit 3683

8/15/06